

**PHARMACOGNOSTICAL AND PHARMACEUTICAL EVALUATION OF *CHINCHA BHALLATAKA VATI*-FOR PRIMARY ADULT HYPOTHYROIDISM**

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**ABSTRACT**

*Chincha Bhallataka Vati* is herbal medicine comprising of equal quantities of *Chincha* and *Bhallataka*, and both of These drug posses *Rasayana* and *Vata- Kaphahara* and *Deepana* activity as per *Ayurvedic* classics and is indicated in condition like *Ajirna*. Hypothyroidism accounts for a huge share of lifestyle diseases all over the world. One of the main goals of treating hypothyroidism is to maintain metabolism of body and to prevent the development of dyslipidemic complication. *Chincha Bhallataka Vati* can be a promising formulation in the management of hypothyroidism. In the present study, an attempt has been made to develop pharmacognostical and pharmaceutical standards for *Chincha Bhallataka Vati*. Pharmacognostical study revealed presence of fibers, starch grains and prismatic crystal of *Chincha*, oli-resin content of *Bhallataka* with pallisade cells, inner mesocarp, Silica deposition, stone cell of *Bhallataka*. Physico-chemical study showed that it is slightly alkaline, having pH 5 and water-soluble extract of 27.62 %. HPTLC study showed 9 and 6 peaks for *Chincha Bhallataka Vati* at 254nm & 366nm respectively.

**KEYWORDS:** *Chincha Bhallataka Vati*, HPTLC, Pharmacognosy, Physicochemical analysis.

**INTRODUCTION**

Hypothyroidism is a clinical syndrome resulting from deficiency of thyroid hormones due to their insufficient synthesis which in turn results in a generalized slowing down of metabolic processes and hence known as underactive thyroid. If thyroid hormone regulates the way in which the body uses the energy-metabolism, and without enough of this hormone many of the body's functions slow down.

Women are affected approximately six times more frequently than men. This is the disease that affects every tissue and every organ of the body and is responsible for the morbidity, reduced life expectancy, and diminished quality of life. Hypothyroidism accounts for a huge share of lifestyle diseases all over the world and India is no exception. Globally, an estimated 42 million adults were living with Thyroid Disorder on June 5, in 2014, compared to 62 million in 1983. The highest prevalence (age-standardized) of hypothyroidism has nearly doubled (13.1%) in age 46-54years, and (7.5%) in age of 18-35years, adult population. Hypothyroidism caused 20% deaths in 2001-10. The percentage of deaths attributable to high cholesterol or hypothyroidism that occurs prior to age 65 is higher in low- and middle-income countries

than in high-income countries.<sup>[1]</sup> Over the past decade, hypothyroidism prevalence has risen faster in low- and middle-income countries than in high-income countries.

For the present study, *Chincha Bhallataka Vati*<sup>[2]</sup> was selected which is potential drug for counteracting the disorder of *Agni* and also *Kapha*. *Bhallataka* preparations are useful in hypothyroidism. *Bhallataka* is described in *Sthavara Visha* in *Brithatrayee*. also, mentioned in *Upavisha Varga* in *Rasatarangini*.<sup>[3]</sup> Antidot of *Bhallataka* is kernel of coconut, sesame seeds, leaves of *Amlika* & *Chincha*, Decoction of *Coriandrum sativum*<sup>[4]</sup>. *Bhallataka* has anti-oxidant property<sup>[5]</sup>, and is used for the treatment of disorders occurring due to auto-immune conditions, also inhibit lipopolysaccharide induced Nitrogen-Oxide production along with hypolipidemic property.<sup>[6]</sup>

The word *Bhallataka* describe the sharp attribute of the herb.<sup>[7]</sup> *S. anacardium* has diverse biological potentials like anti-cancer, anti-inflammatory, anti-oxidant, anti-bacterial, anti-atherogenic properties. In addition, we found it also has property to reduce the levels of ammonia, urea in the blood.<sup>[8]</sup> *Chincha* is *Agni Deepak*, *Rukshna*, *Sara*, *Ushna* and *Kapha Vata shaman* and

hence, this combination may be effective in treating the case of hypothyroidism. As hypothyroidism is mainly caused due to malfunctioning of *Agni*, this trial drug has been chosen.

It is important to ensure the standard and quality right from the raw drugs to the finished product. Hence an attempt has been made to study *Chincha Bhallataka Vati* by pharmacognostical, physico-chemical parameters and

to develop HPTLC (High-Performance Thin Layer chromatography study) of *Chincha Bhallataka Vati*.

## MATERIALS AND METHODS

### Collection of raw drugs

All the raw drugs for preparation of *Chincha Bhallataka Vati* was procured from Gujarat Ayurved Pharmacy, Jamnagar.

**Table No.1: Ingredients and the part used of *Chincha Bhallataka Vati*.**

Drug	Latin name	Family	Part used	Properties	Proportion
<i>Bhallataka</i>	<i>Semecarpus anacardium</i> Linn.f.	Anacardiaceae	<i>Phala</i>	<i>Rasa-Katu, Tikta Kashaya</i> <i>Guna-Laghu; Snigdha</i> <i>Tikshna.</i> <i>Virya-Ushna</i> <i>Vipaka-Madhura.</i> <sup>[9]</sup>	1 Part
<i>Chincha</i>	<i>Tamarindus indica</i>	Fabaceae	<i>Phala</i>	<i>Rasa-Amla</i> <i>Guna-Ruksha</i> <i>Virya-Ushna</i> <i>Vipaka-Amla</i>	1 part

### Method of preparation of *Chincha Bhallataka Vati*

Dry fruit of *Bhallataka* were kept in *Ishtika churna*<sup>[10]</sup> for 7 days then it was boiled in tender coconut water for 3hr. Thereafter, it was again boiled in cow's milk 1hr. Then it was kept for drying for 3 days & made into fine powder *Chincha* was smashed & kept for drying for 3 days & made into fine powder. In the end both ingredients were mixed properly & made into tablet of 250mg.

### Pharmacognostical Study

Pharmacognostical analysis of powder was based on organoleptic characters and microscopic study. For this *Chincha bhallataka Vati* was dissolved in small quantity of distilled water, filtered through filter paper and the precipitate was treated with or without stain to find out the characters and was later compared with the findings of individual ingredients of the *Chincha Bhallataka Vati*. The micro photographs were taken under Carl Zeiss Trinocular microscope attached with camera.,<sup>[11,12,13]</sup>

### Pharmaceutical Study

*Chincha Bhallataka Vati* was analyzed with appropriate protocols for standard physico-chemical parameters, such as aqueous soluble extract, alcohol soluble extract, pH, uniformity of weight, total ash, loss on drying as per CCRAS recommendations at the Pharmaceutical Chemistry Laboratory, IPGT & RA.<sup>[14]</sup>

**HPTLC:** Methanol extract of *Chincha Bhallataka Vati* was spotted on pre-coated silica gel GF 60<sub>254</sub> aluminum plates by means of Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. The mobile phase consisted of Chloroform: MeOH in a ratio of 9:1 v/v. After development densitometry scan was performed with a Camag T. L. C. scanner III in reflectance absorbance mode at 254nm and 366nm under control of Win CATS Software (V 1.2.1. Camag). Then

the plate was sprayed with Vanillin Sulphuric acid followed by heating and then visualized in day light.

**Organoleptic evaluation:** Organoleptic features like color, odour, taste, touch, weight of the *Chincha Bhallataka Vati* were recorded and are placed in **Table no 2**

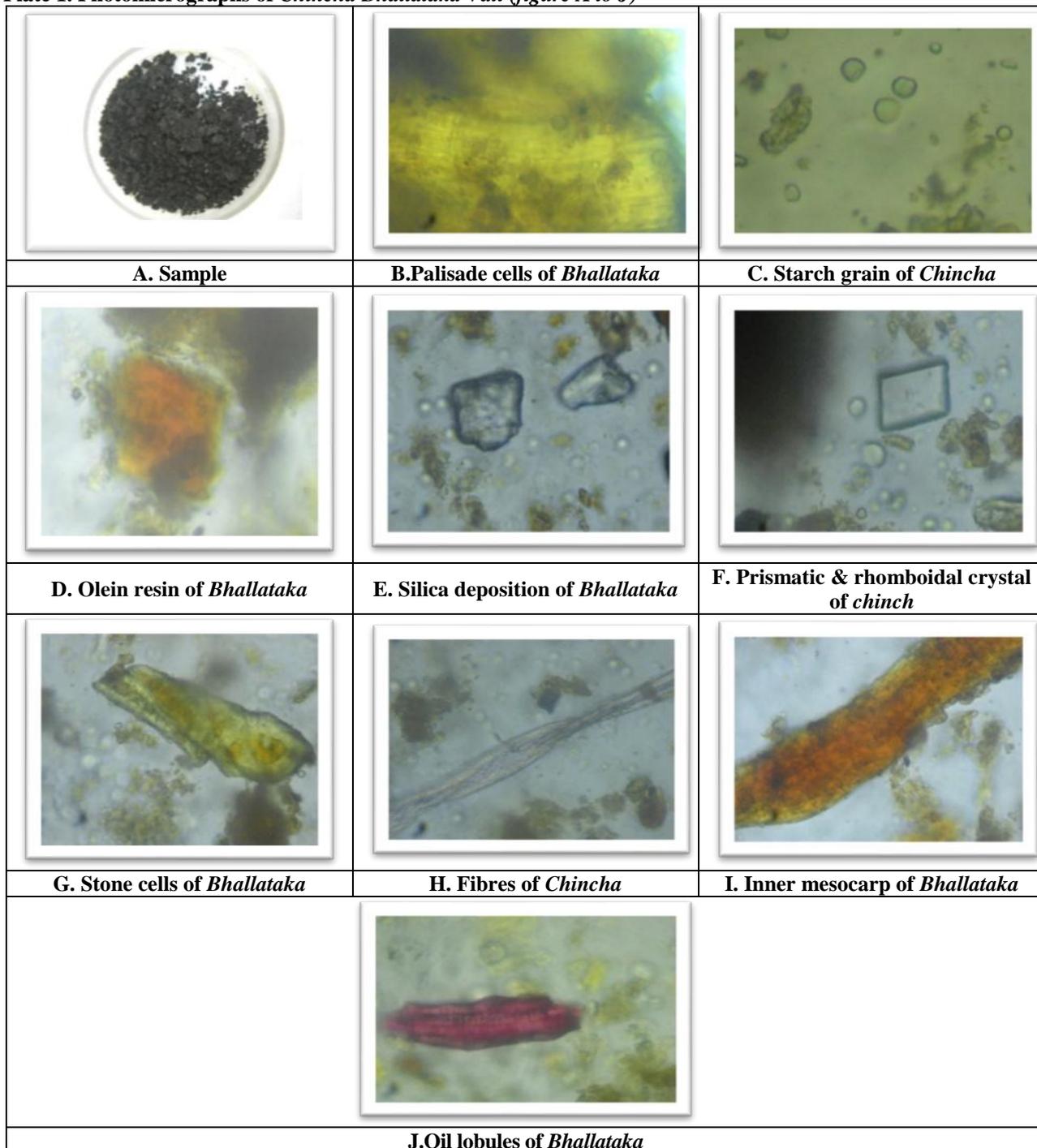
**Table 2: Organoleptic characters of *Chincha Bhallataka Vati*.**

Sr. No.	Characters	Result
1	Colour	Black
2	Odour	Sour
3	Taste	Sour followed by astringent
4	Touch	Tablet
5	Weight	250mg

**Microscopic evaluation:** Microscopic evaluation was conducted by dissolving powders of *Chincha Bhallataka Vati* in the distilled water, then stained and studied under microscope for the presence of characteristics of ingredient drugs. Powder microscopy of *Chincha Bhallataka Vati* showed striking characters of all individual constituents which is summarized in **Table 3**.

**Table 3: Microscopic characters of *Chincha Bhallataka Vati*.**

Drug	Character
<i>Chincha Bhallataka Vati</i>	Oil globules of <i>Bhallataka</i> Palisade cells of <i>Bhallataka</i> Starch grain of <i>Chincha</i> Olein resin of <i>Bhallataka</i> Silica deposition of <i>Bhallataka</i> Prismatic & rhomboidal crystal of <i>Chincha</i> Stone cells of <i>Bhallataka</i> Fibers of <i>Chincha</i> Inner mesocarp of <i>Bhallataka</i>

**Plate 1. Photomicrographs of *Chincha Bhallataka Vati* (figure A to J)****Pharmaceutical study of *Chincha Bhallataka Vati***

Physico-chemical parameters like loss on drying, ash value, water and alcohol soluble extract etc. were carried out and the results are depicted in Table no.5.

**Table no.5. Physico-chemical parameters of *Chincha Bhallataka Vati***

Name of the Analysis	Value of <i>Chincha Bhallataka Vati</i>
Ash value percentage	8.30% w/w
Loss on drying percentage	9.7% w/w
Water soluble extract percentage	27.62% w/w
Alcohol soluble extract percentage	8.601% w/w
pH value (5% Aqueous Extract)	5

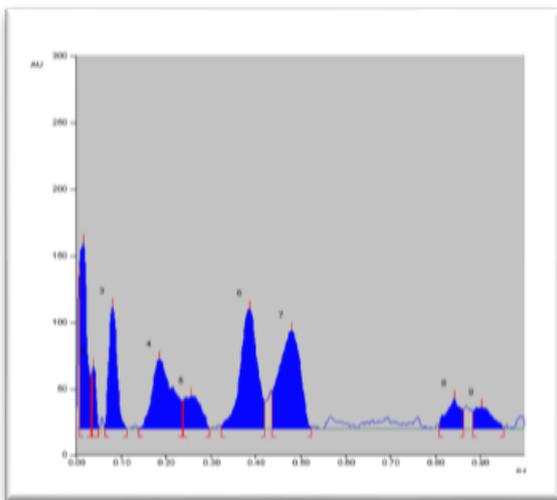
**High performance thin layer chromatography (HPTLC)**

On performing HPTLC, the chromatogram of *Chincha Bhallataka Vati* showed 9 peaks with maximum R<sub>f</sub> values 0.02,0.04,0.08,0.19,0.26,0.39,0.48,0.84, and

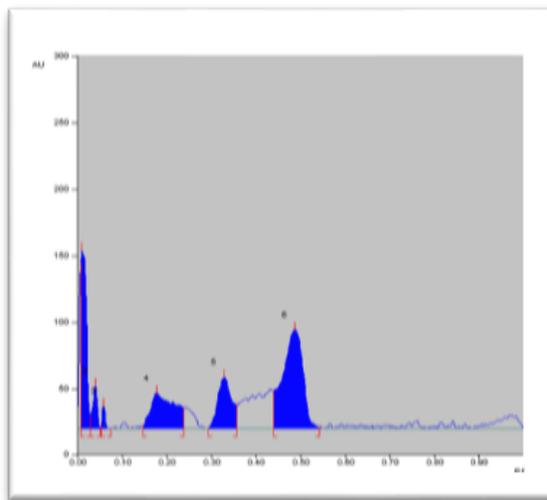
0.90 and short-wave UV 254nm; while at long wave UV 366 nm, the chromatogram showed 6 spots with maximum R<sub>f</sub> values 0.01, 0.04,0.06,0.18,0.33 and 0.49 [Table 5 (Plate 2. Fig.1 - 2)]

**Table 6: HPTLC results of *Chincha Bhallataka Vati*.**

HPTLC	254 nm		366nm	
	No. of Spots	Rf Value	No. of Spots	Rf Value
	9	0.02,0.04,0.08,0.19,0.26,0.39,0.48,0.84, and 0.90	6	0.01, 0.04,0.06,0.18,0.33 and 0.49

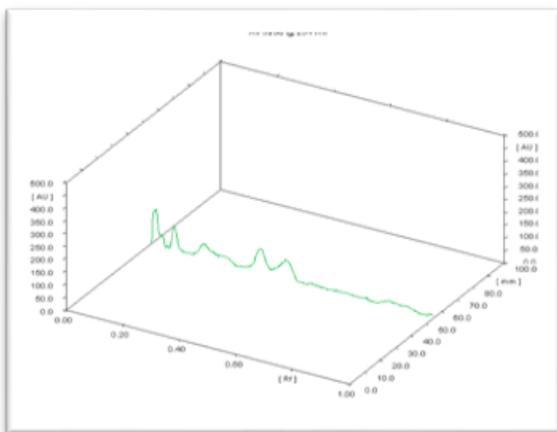


**Fig.1**

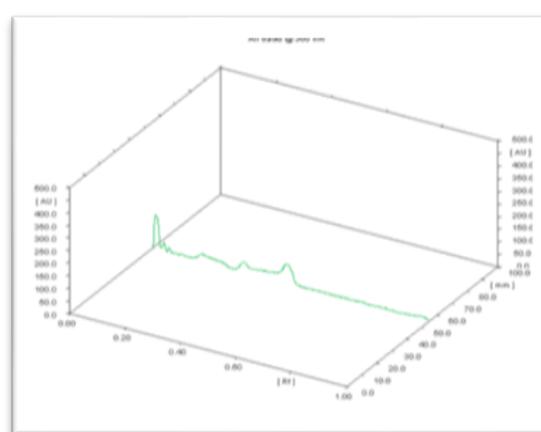


**Fig.2**

**Plate 2. HPTLC Study.**



**A. Spectra at 254nm**



**B. Spectra at 366nm**

**Plate 3: Three-Dimensional Spectra Comparison.**

**DISCUSSION**

*Chincha Bhallataka Vati*, the formulated drug, thought to be beneficial for Hypothyroidism has been analyzed. Study on *Chincha Bhallataka Vati* was a step towards pharmacognostical and pharmaceutical standardization of the drug. The presence of all contents of raw drugs in the final product showed the genuinity of the final product. All the pharmaceutical parameters analyzed has shown values permissible for the *Churna*. Pharmacognostical results showed that Palisade cells of

*Bhallataka*, Starch grain of *Chincha*, Olein resin of *Bhallataka* proves the genuinity of the finished product. The physico-chemical parameters showed that percentage of water soluble extract was more than alcohol soluble extract. Ash value of the final product is 8.30% w/w shows the presence of inorganic material. It also showed presence of slightly acidic nature of *Churna*. Thus, it can be inferred that the drug may yield desired pharmacological action. HPTLC study showed 9 and 6

peaks for *Chincha Bhallataka Vati* at 254nm & 366nm respectively.

### CONCLUSION

The formulation *Chincha Bhallataka Vati* which was subjected to pharmacognostical study, reveal genuineness of all the ingredient as, microscopic characters were observed. Physico-chemical and HPTLC studies inferred that the formulation meets the minimum quality standards as reported in the API at a preliminary level. Though the ground work requisites for the standardization of *Chincha Bhallataka Vati* is covered in the current study, additional important analysis and investigations are required for the identification of all the active chemical constituents of the test drug to substantiate the clinical efficacy. The inference from this study may be used as reference standard in further quality control researches.

### REFERENCE

1. www.thyroidindia.com/thyroid-disorder-general-population-thyroid disorder in general population on 7 march 2017 Global report of Hypothyroidism-world health organization www.who.internet.com 2
2. Ayurveda Nibhanda Mala part-2 Author -Shah Tilak Chand Tara Chand, Ajirna Adhayaya- 6 Vaidya-Surat Publication- Sastu Sahitya, Akandkhandit 4<sup>th</sup> Edition, 1997; 498.
3. Pandit Kashunath Shastri, Rasatarangini of Sadanand Sharma Reprint edi, Motilal Banarsidas Prakashak, Delhi; chapter 24/479, Vishopvishavidnyaniyam, 1994; 735.
4. The Indian material medica-Nadkarni, 1904.
5. Premlutha B, Semecarpus Anacardium Linn. nuts. Aboon in alternative medicine, Indian J Exp Biol, 2000; 38(02): 1177.
6. Tripathi YB & Pandey R.S. Indian J Exp BIOL, 2004; 42(4): 432.
7. *Madanpal, Madanpalnighantu, Abhayadivarga* 1/280-281, Balvant Kulkarni, Karekar, Yashwant Press, Pune, 1st ed., 1930; 44.
8. S. Patil, K.Gumna, Md. Mateen Uddin, Aqueous extract of *S. anacardium* fruit showed significant anti-inflammatory effect, IJCRR, 2013; 5(20): 101-104.
9. Dravya Guna Vijnana Vol.2 Author-Priyavrata Sharma, Chaukhambha bharti Academy, Publisher & Distributor of Monumental Treatises of east Gokul Bhagwan, K., 2006; 37(109).
10. Ilanchezhian R, Roshy Joseph C Rabinarayan Acharya, Importance of Media in Shodhana of Poisonous herbal drugs. Ancient Science of life, 2019; 30(2): 27-30.
11. Khandelwal KR. Practical Pharmacognosy techniques and experiments. 19th ed. Pune: NiraliPrakashan, 2008; 149-166.
12. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. 42 nd ed. Pune: NiraliPrakashan; 2008. (p.102).
13. Anonymous, Parameters for qualitative assessment of Ayurveda and Siddha drugs, Part A, New Delhi: CCRAS, 2005; 31.